Economic evaluation of the cochlear implant

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Cochlear implantation

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
Profoundly and partially deaf adults and children.

Setting
Hospital. The economic study was carried out in Australia.

Dates to which data relate
Effectiveness data were derived from studies published between the end of 1992 and the end of 1994. Cost data were collected from 1994 onwards. 1994 prices were used.

Source of effectiveness data
Review of studies.

Outcomes assessed in the review
Improvement in quality of life, safety and reliability.

Study designs and other criteria for inclusion in the review
A number of unspecified studies, a recent review by the French health technology assessment agency (ANDEM), and other papers provided by Cochlear Ltd, Sydney.

Sources searched to identify primary studies
MEDLINE.

Criteria used to ensure the validity of primary studies
Not stated.
Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Not stated.

Methods of combining primary studies
Narrative review.

Investigation of differences between primary studies
Not investigated.

Results of the review
The Nucleus implant was highly reliable and relatively safe, and it improved quality of life.

Measure of benefits used in the economic analysis
Quality Adjusted Life Years (QALYs) The following health-related quality of life instruments were used to derive utility values: the Sintonen HRQOL-15D and, in the preliminary analysis, the Quality of Well-Being Scale (QWBS, by Kaplan and Anderson). Values for each patient group were based on expert opinions (doctors and researchers specialised in the cochlear implant field). The improvement in health-related quality of life was defined as 'low value' (dimensions: hearing, speech, usual activities and distress); 'middle value' (the following dimensions were added: sleeping, depression and vitality); 'high value' (adding the following: mobility, mental function, discomfort/symptoms, sexual activity, vision).

Direct costs
Some costs and quantities were reported separately. Costs were considered from the government/service provider perspective. Costs related to CT scan, surgery, hospital stay, rehabilitation, psychologist support, promontory stimulation, cochlear implant, and threshold checks. Costs were based on an actual sample population. Costs were discounted at 5%. 1994 prices were used.

Currency
Australian dollars (Aus$)

Sensitivity analysis
A simple one-way sensitivity analysis was conducted to test variations in the discount rate, cost, rate of long term rehabilitation, and proportion in mainstream schooling for children.

Estimated benefits used in the economic analysis
The improvement in health-related quality of life ranged from 11% ('low value') to 37% ('high value') for profoundly deaf adults. Approximately the same improvement was reported for partially deaf adults and for children.

QALYs were discounted at 5%. QALYs were not reported separately but were included in the cost-utility ratio (see below).
Cost results
Total (average) costs were not reported separately but were included in the cost-utility ratio (see below).

Synthesis of costs and benefits
The results for different scenarios were reported considering an implant life-time duration of 10, 15 and 20 years.

For profoundly deaf adults, cost/QALY gained ranged from Aus$10,895 (implant lifetime of 20 years, 'high value') to Aus$45,630 (10 years, 'low value').

For partially deafened adults, the ratio ranged from Aus$13,310 (20 years, 'high value') to Aus$49,070 (10 years, 'low value'). For children the ratio ranged from Aus$1,580 (20 years, 'high value') to Aus$13,020 (10 years, 'low value'). The results were sensitive to increases in the discount rate (with a discount rate of 10%, the ratio for profoundly and partially deaf adults increased to Aus$21,270 and Aus$33,700 respectively). The cost-utility ratio for children was sensitive to the rates of long term rehabilitation required and the proportion of implantees who could attend normal schools (baseline analysis with a duration of the implant of 15 years and using the middle value for the quality of life).

Authors' conclusions
The authors concluded that the implantation is good value for money, especially for profoundly deaf children. However they recognised that a further extension of the analysis, including for example the adverse effects of cochlear implantation, would have been useful.

CRD Commentary
In this study the effectiveness analysis relied on a review of the literature which was not carried out in a systematic way. The health outcomes used in the economic analysis further investigated the results on the quality of life of patients in order to derive QALYs. This analysis was based on an actual sample of patients, and a 'before-after' study design was used. However, some relevant information were missing from the analysis, such as the sample size, the duration of follow-up and (as the authors themselves recognised) the impact of the side-effects of the intervention on the final measure of quality of life. The impact of the costs of side-effects on the cost-utility ratios should have been considered as well. Finally, differences in clinical practice may represent a limitation to the generalisability of this study.

Bibliographic details

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